

Review

Associations between minority stress, depression, and suicidal ideation and attempts in transgender and gender diverse (TGD) individuals: Systematic review and meta-analysis

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ABSTRACT

Minority stress theory posits that transgender and gender diverse (TGD) individuals exhibit greater rates of depression and suicidality due to internal (proximal) and external (distal) stressors related to their TGD identity. Yet, the magnitude of the relationship between minority stress processes and mental health outcomes has not been quantitatively summarized. The current research meta-analyzed the relationship between minority stress constructs and depression, suicidal ideation, and suicide attempt. Results from 85 cross-sectional quantitative studies indicate that distal stress, expectations of rejection, internalized transphobia, and concealment are significantly associated with increased depression, suicidal ideation, and suicide attempt. Greater effect sizes were observed for expectations of rejection and internalized transphobia when compared to distal stress and concealment. Future research on the relationship between minority stress, depression, and suicide would benefit from longitudinal designs and more diverse and representative samples of TGD individuals.

Transgender and gender diverse (TGD) refers to individuals “who have a gender identity that is not fully aligned with their sex assigned at birth” (American Psychological Association, 2015, p. 832).¹ It is estimated that approximately 0.1–0.7% of the population of the United States identifies as transgender (Collin, Reisner, Tangpricha, & Goodman, 2016; Crissman, Berger, Graham, & Dalton, 2017; Flores, Herman, Gates, & Brown, 2016). With greater acceptance and public visibility of TGD people (GLAAD, 2020; Luhur, Brown, & Flores, 2019), the relative size of the TGD population has risen in recent years, leading to an increase in demand for gender-affirming mental health services (Goodman et al., 2019; Meerwijk & Sevelius, 2017; Wiepjes et al., 2018; Zucker, 2017). This change in demand for services demonstrates a need for clinical psychologists to better understand the TGD community, including intervenable factors that contribute to its high vulnerability to depression and other mental health problems.

Transgender and gender diverse (TGD) individuals exhibit significantly higher rates of negative mental health outcomes compared to their cisgender peers, including depression (Borgogna, McDermott, Aita, & Kridel, 2019; Connolly, Zervos, Barone, Johnson, & Joseph, 2016;

Witcomb et al., 2018) and suicidal ideation and attempt (Haas et al., 2010; Marshall, Claes, Bouman, Witcomb, & Arcelus, 2016). They also experience higher rates of other poor psychosocial and health outcomes, including higher rates of HIV (Herbst et al., 2008; Niforatos, Wanta, Durbak, Cavendish, & Yax, 2020), substance use (Gonzalez, Gallego, & Bockting, 2017; Hughes & Eliason, 2002), body dissatisfaction and disordered eating (Coelho et al., 2019; Jones, Haycraft, Murjan, & Arcelus, 2016), and adverse childhood experiences (Schnarrs, Stone, Salcido, Baldwin, & Nemeroff, 2019). The prevailing explanatory theory for these disparities is *minority stress theory* (Hendricks & Testa, 2012; Meyer, 1995, 2003), which proposes that higher rates of mental disorders in TGD individuals results, not directly from being TGD, but from negative social, interpersonal, and psychological experiences related to their stigmatized minority status. This theory posits that there are two primary types of minority stress. *Distal* minority stress includes “those external events that occur in the [TGD] individual's environment and are related to either knowledge or perception of the individual's minority status” (Hendricks & Testa, 2012, p. 462). *Proximal* minority stress, meanwhile, comprises internal stress processes related to one's gender

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¹ Other commonly-used terms for this population include gender minority, gender-expansive, gender nonconforming, and gender-variant. *Transgender and gender diverse* (TGD) will be used throughout this article as an umbrella term to refer to individuals whose gender identity does not match their sex assigned at birth and/or whose gender expression does not conform to socially prescribed expectations and norms (Chen, Edwards-Leeper, Stancin, & Tishelman, 2018).

identity or expression, and includes expectations of rejection or discrimination based on TGD identity, concealment of one's TGD identity, and internalized transphobia or TGD-related self-stigma.

Experiences of distal minority stress are relatively common among TGD individuals. This population experiences disproportionate rates of violence victimization compared to their cisgender peers, and these experiences of violence are associated with disproportionate rates of mental health problems (Grant et al., 2011; Stotzer, 2009). Much of this violence likely results from others' perception or knowledge of their TGD identity, making it fall under the umbrella of distal stress. For example, asking to be treated according to their gender identity (e.g., through use of pronouns and name) significantly predicts violence victimization (Domínguez-Martínez et al., 2020). Likewise, gender nonconformity is also associated with greater levels of violent victimization among TGD people (Miller & Grollman, 2015). These experiences of overt victimization are not unique to adults; TGD youth also experience higher rates of in-person and online bullying compared to their cisgender peers (Abreu & Kenny, 2018; Reisner, Greytak, Parsons, & Ybarra, 2015; Ybarra, Mitchell, & Kosciw, 2014).

Distal stress encompasses not only overt violence and victimization, but also more institutional and environmental forms of discrimination against TGD individuals. TGD adults experience discrimination in housing and employment at significantly higher rates compared to even their sexual minority peers (Kattari, Whitfield, Walls, Langenderfer-Magruder, & Ramos, 2016). These experiences can range from denial or termination of employment and hostile work environment (Brewster, Velez, Mennicke, & Tebbe, 2014; Budge, Tebbe, & Howard, 2010; Dispenza, Watson, Chung, & Brack, 2012), to denial of access to housing and eviction (Esses, 2008).

Furthermore, despite their particular physical health needs (e.g., gender-affirming medical interventions), TGD people frequently encounter distal stressors in healthcare settings, in the form of non-affirmation from providers, lack of competence or knowledge in gender-affirming care, and denial of gender-affirming care by insurance providers (Cicero, Reisner, Silva, Merwin, & Humphreys, 2019; Romanelli & Lindsey, 2020). These barriers to gender-affirming care have significant implications for TGD mental health; although medical transition is associated with improved mental health outcomes (Achille et al., 2020; Bränström & Pachankis, 2020; White Hughto & Reisner, 2016), many TGD individuals delay care due to fear of discrimination from healthcare providers (Glick, Theall, Andrinopoulos, & Kendall, 2018; Seelman, Colón-Díaz, LeCroix, Xavier-Brier, & Kattari, 2017).

Proximal forms of minority stress also play an important role in the mental health and well-being of TGD persons. Many TGD individuals frequently internalize negative societal messages and attitudes towards those who identify as TGD, which often leads to feelings of emotional distress and negative self-perception (Rood, Reisner, et al., 2017b). They also often expect rejection from others in a variety of social settings, and this hypervigilance can lead to feelings of exhaustion, fear, and self-loathing (Rood et al., 2016). Finally, theory suggests that proximal stressors serve as a mediator between distal forms of stress and poor mental health outcomes in the TGD population (Hatzenbuehler, 2009). Additionally, proximal minority stress may also exacerbate the impact of distal stress on mental health outcomes (e.g., Rood, Maroney et al., 2017a).

Quantity of and interest in research into TGD mental health has grown dramatically in recent years (Delli & Livas, 2021; Sweileh, 2018), with much written about its relationship with minority stress processes. A recent review has found consistent evidence for associations between TGD minority stress processes, depression, and suicidality (Valentine & Shipherd, 2018). Nevertheless, the relative importance of each of these minority stress constructs on mental health outcomes has yet to be quantified. Existing research is equivocal as to whether poor mental health outcomes are more strongly associated with distal (e.g., Zeluf et al., 2018) or proximal (e.g., Testa, Habarth, Peta, Balsam, & Bockting, 2015) minority stress constructs. It is also unclear the extent to which

participant- and study-level variables impact the observed relationships between TGD minority stress and mental health outcomes. Therefore, the objective of the current study is to systematically review and meta-analyze quantitative research that examines the relationship between minority stress constructs and depression, suicidal ideation, and suicide attempt in TGD individuals.

1. Method

The current meta-analysis follows PRISMA reporting guidelines for meta-analyses (Moher, Liberati, Tetzlaff, Altman, & The PRISMA Group, 2009) and was pre-registered in PROSPERO (ID# CRD42020185063) before systematic searches, data extraction, and analyses were performed.

1.1. Search strategy

Boolean operators were used to combine search terms related to TGD identity, minority stress processes, depression, and suicidality. TGD-related keywords were derived from a previous systematic review of search terms related to TGD populations (Lee, Ylloja, & Lackey, 2016). Using the EBSCOhost interface, searches of the PsycINFO, MEDLINE, and LGBT Life databases were conducted for records published between January 1, 2000 and June 1, 2021. The search string can be seen in Appendix A.

1.2. Eligibility criteria

Inclusion criteria sought to restrict included records to quantitative research that reports effect sizes for the relationship between minority stress constructs and depression or suicidality in TGD samples. To be included, studies must have satisfied the following inclusion criteria: (1) published in English; (2) sample consists entirely of TGD participants or provides effect size(s) for TGD subsamples; (3) contains at least one measure of minority stress (i.e., internalized transphobia, concealment/disclosure, expectations of rejection, or distal stress); (4) contains at least one measure of depression (e.g., binary diagnosis, rating scale of depressive symptoms), suicidal ideation, or suicide attempt; and (5) reported an effect size for the relationship between measures of minority stress and depression, suicidal ideation, or suicide attempt. In order to restrict included articles to those examining TGD populations in isolation, studies were excluded if they only reported effect sizes for combined sexual minority and TGD samples. Furthermore, since HIV stigma processes mirror those of gender-related minority stress (e.g., both include internalized stigma; Earnshaw & Chaudoir, 2009; Earnshaw, Smith, Chaudoir, Amico, & Copenhaver, 2013), and HIV-status is significantly associated with the outcomes of interest (e.g., Ciesla & Roberts, 2001; Pelton et al., 2021), studies were excluded if their sample consisted entirely of HIV+ individuals. For studies in which minority stress constructs and outcomes of interest were measured but insufficient information was reported to calculate an effect size ($n = 53$), corresponding authors were contacted to request relevant data. Twelve of the contacted authors provided at least some of the requested information, yielding an additional 21 effect sizes to be included in the final analyses.

1.3. Study selection and coding

A flow diagram showing the search and study selection processes is displayed in Fig. 1. Database searching and screening of titles and abstracts for inclusion were conducted by the first author. The database search yielded 1690 records (1335 after duplicates were removed), of which 322 were selected by the first author for full-text review. The first author reviewed the full-texts of selected studies for inclusion criteria, and the second author reviewed 25% of the full-text articles, with disagreements resolved through discussion.

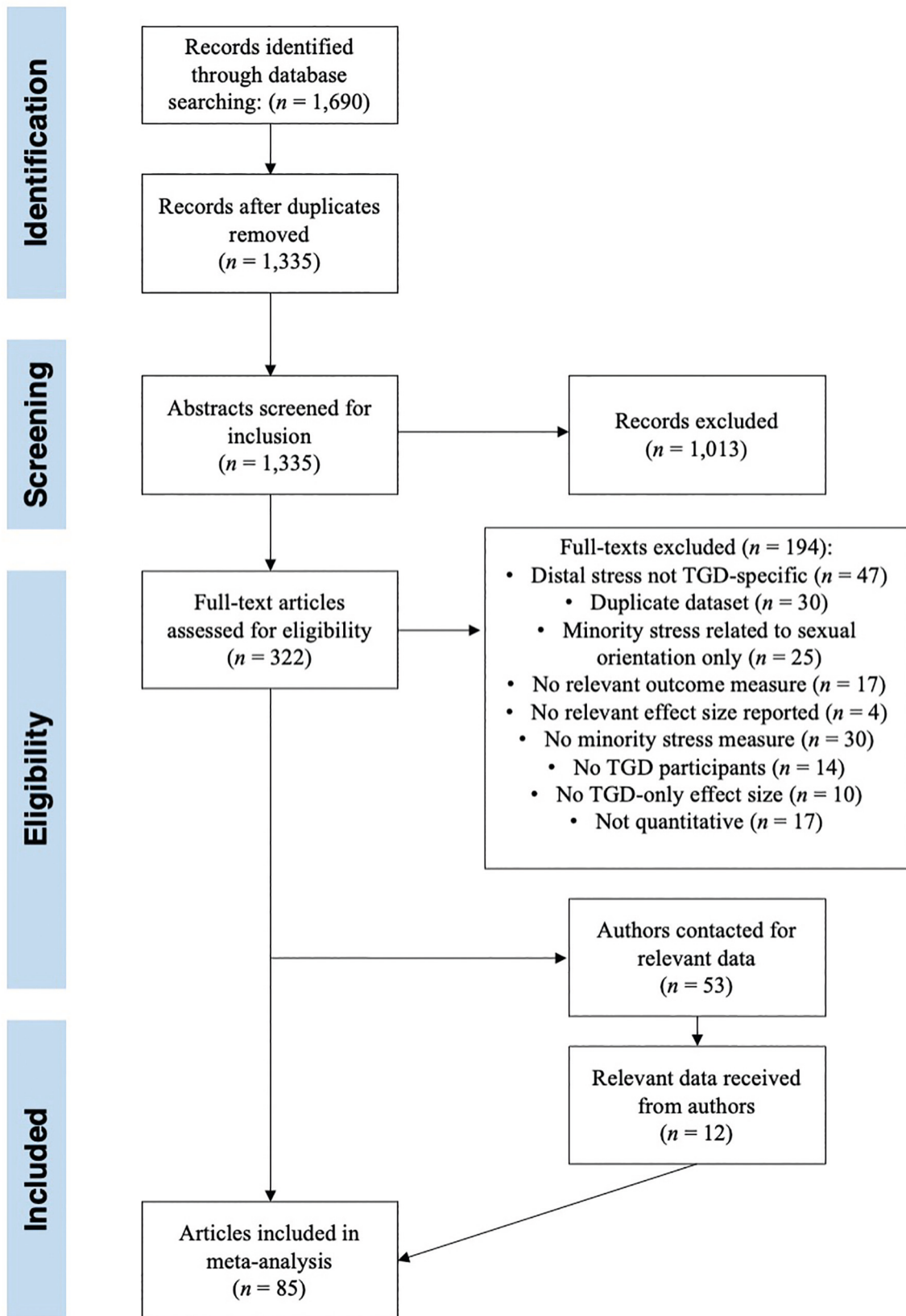


Fig. 1. PRISMA flowchart.

All studies that met inclusion criteria ($n = 85$) were then independently coded by the first author and 25% of those studies were re-coded by the second author, with disagreements resolved through discussion. Effect sizes for the relationship between minority stress, depression, and suicidality were extracted, along with the specific scales that were used to measure these constructs. The following moderator variables were also extracted from each of the included studies: sample size, study design, country, mean age of sample, proportion of sample assigned female at birth, proportion of sample identified as non-White, and proportion of sample identified as a sexual minority.

1.4. Analytic plan

All analyses were conducted in R version 4.0.5 (R Core Team, 2021) and RStudio 1.4.1106 (RStudio Team, 2021) using the “meta” (Balduzzi, Rücker, & Schwarzer, 2019) and “metafor” packages (Viechtbauer, 2010). Twelve pooled effect sizes were estimated to assess the strength of the relationship between minority stress constructs (i.e., distal stress, internalized transphobia, expectations of rejection, and concealment) and mental health outcomes (i.e., depression, suicidal ideation, and suicide attempt). Following the methods outlined by Borenstein, Hedges, Higgins, and Rothstein (2009), all effect sizes were converted to correlation coefficients. In studies where only standardized regression coefficients were reported, these effect sizes were converted to correlation coefficients using the imputation formula specified by Peterson and Brown (2005). In studies where only a chi-square value was reported, those effect sizes were converted to correlation coefficients using the formula specified by Rosenberg (2010). When a study reported multiple effect sizes for distal stress (e.g., separately for victimization and discrimination), the mean of these effect sizes was used. Fisher's r -to- z transformation was conducted on correlation coefficient effect sizes in order to reduce Type I error rates (Alexander, Scozzaro, & Borodkin, 1989). Where the article text stated that a relationship between minority stress and outcome variables of interest was non-significant, but no numerical effect size was reported, an effect size of $r = 0$ was imputed.

Measures of heterogeneity were used to determine the consistency of the effect sizes across studies for each predictor and outcome variable pair. Two statistical methods were used in the current meta-analysis to quantify between-study variability: Q and I^2 . Q is a statistical test that determines the presence or absence of significant heterogeneity (i.e., if Q is significant, there is significant between-study heterogeneity), whereas I^2 determines the degree of between-study heterogeneity in effect sizes (Huedo-Medina, Sánchez-Meca, Marín-Martínez, & Botella, 2006). I^2 values of 25%, 50%, and 75% indicate low, medium, and high levels of heterogeneity respectively (Higgins, Thompson, Deeks, & Altman, 2003). Given that heterogeneity is typically expected in meta-analyses (Higgins, 2008), a random-effects model was used for the current meta-analysis since it does not assume an identical true effect size across studies (Borenstein, Hedges, Higgins, & Rothstein, 2010).

In order to ensure adequate power to conduct moderator analyses, a minimum of 10 studies per study-level moderator variable was used (Deeks, Higgins, & Altman, 2019; Fu et al., 2011). For those minority stress/mental health variable pairs with $k \geq 10$, moderator analyses were conducted for each moderator variable individually. If multiple moderator variables were found to be significant, and there were an adequate number of included studies (i.e., at least 10 per significant moderator), all significant moderator variables were entered together into a meta-regression predicting effect size.

1.5. Publication bias

Deliberate steps were taken to prevent and detect the potential effect of publication bias on the results of the current meta-analysis. Since graduate theses often remain unpublished if they do not contain significant results (Easterbrook, Berlin, Gopalan, & Matthews, 1991), the inclusion criteria for the current meta-analysis allowed for non-

published doctoral dissertations and masters' theses to reduce the potential for publication bias. Furthermore, the potential effect of publication bias on results was assessed in two ways: funnel plots and fail-safe N .

Funnel plots, which plot study effect sizes against their standard error (Sterne, Becker, & Egger, 2005), were visually inspected for asymmetry (an indicator of publication bias). In addition, due to the fallibility of visual identification of publication bias in funnel plots (Terrin, Schmid, & Lau, 2005), Egger's regression test (Egger, Smith, Schneider, & Minder, 1997) was used to statistically test for the presence of significant funnel plot asymmetry. Fail-safe N can be defined as the hypothetical number of studies with null findings that, when added to the pooled effect size, would make the overall z -test non-significant (Orwin, 1983; Rosenthal, 1979). This value has been characterized as a useful method of evaluating the stability of the results of a meta-analysis if new, null results were later found (Carson, Schriesheim, & Kinicki, 1990). For $\alpha = 0.05$, the following formula was used to calculate fail-safe n :

$$N_{fs} = (k/2.706)[k(Z_k)^2 - 2.706]$$

where k is the number of studies and Z_k is the mean Z obtained for the k studies” (Rosenthal, 1979, p. 639). Rosenthal (1979) suggests that effect sizes are resistant to the effect of publication bias (the file-drawer effect) if $N_{fs} > 5k + 10$, and this rule of thumb was used for the current meta-analysis.

1.6. Study quality assessment

Individual study quality was assessed by the first author using the Appraisal Tool for Cross-Sectional Studies (AXIS; Downes, Brennan, Williams, & Dean, 2016). This tool consists of 20 items that assess various facets of the studies' methodological and reporting quality, including clarity of study methods, representativeness of the study sample, likelihood of sampling and selection bias, and appropriateness of study variables and measures. Each study included in the current meta-analysis was assigned a rating for each of the 20 AXIS items: yes (+), no (-), or unknown/insufficient information (?).

2. Results

2.1. Description of studies

A total of 85 studies were included in the current meta-analysis, yielding 159 effect sizes for the relationship between minority stress and mental health constructs. Included studies are listed in Appendix B. Included studies were published between 2006 and 2021, with a median publication year of 2018. Sample sizes of TGD participants ranged widely from 6 to 5584 ($M = 502.38$, $SD = 924.96$). Regarding sample location, 59 of the included studies (69.41%) recruited their samples primarily from the United States and/or Canada. All of the effect sizes included in the current meta-analysis examined the cross-sectional relationship between minority stress and mental health constructs.

2.2. Preliminary analyses

Heterogeneity. Observation of substantial heterogeneity provided support for the use of a random-effects model over a fixed-effects model. Significant Q -tests of homogeneity were found for the relationship between depression and distal stress ($Q(55) = 547.21$, $p < .001$), internalized transphobia ($Q(15) = 109.87$, $p < .001$), expectations of rejection ($Q(10) = 35.79$, $p < .001$), and concealment ($Q(9) = 26.57$, $p = .002$). Significant heterogeneity was also observed for the association between suicidal ideation and distal stress ($Q(27) = 299.45$, $p < .001$) and internalized transphobia ($Q(5) = 64.02$, $p < .001$), but not expectations of rejection ($Q(2) = 5.28$, $p = .071$), and concealment ($Q(1) =$

1.31, $p = .253$). Lastly, significant heterogeneity was observed for associations between suicide attempt and distal stress ($Q(19) = 229.67, p < .001$) and internalized transphobia ($Q(3) = 10.70, p = .013$), but not expectations of rejection ($Q(1) = 0.43, p = .513$). Due to an insufficient number of studies ($k = 1$), Q could not be calculated for the relationship between suicide attempt and concealment.

Further evidence for significant heterogeneity is provided by high I^2 values. Based on the interpretations of I^2 proposed by Higgins et al. (2003), high levels of heterogeneity among effect sizes were observed for the relationship between depression and distal stress ($I^2 = 89.9$), internalized transphobia ($I^2 = 86.3$), expectations of rejection ($I^2 = 72.1$), and concealment ($I^2 = 66.1$). Heterogeneity was also high for the relationship between suicidal ideation and distal stress ($I^2 = 91.0$), internalized transphobia ($I^2 = 92.2$), and expectations of rejection ($I^2 = 62.1$), but low for concealment ($I^2 = 23.6$). Finally, heterogeneity was high for the relationship between suicide attempt and distal stress ($I^2 = 91.7$) and internalized transphobia ($I^2 = 72.0$), but low for expectations of rejection ($I^2 = 0.00$). As with Q , I^2 could not be calculated for the relationship between suicide attempt and concealment due to an insufficient number of studies.

2.3. Main analyses

Bivariate summary effect sizes. Main analyses examining the relationship between mental health and minority stress constructs are displayed in Table 1. Significant pooled effect sizes were observed for associations between depression and proximal minority stress variables, including internalized transphobia ($r = 0.33, 95\% \text{ CI } [0.24, 0.40], k = 16$), expectations of rejection ($r = 0.35, 95\% \text{ CI } [0.28, 0.41], k = 11$), and concealment ($r = 0.22, 95\% \text{ CI } [0.15, 0.29], k = 10$). Similar results were found for the association between depression and distal minority stress ($r = 0.26, 95\% \text{ CI } [0.22, 0.30], k = 56$). With suicidal ideation as the outcome of interest, significant pooled effect sizes were found for distal stress ($r = 0.24, 95\% \text{ CI } [0.19, 0.29], k = 28$), internalized transphobia ($r = 0.29, 95\% \text{ CI } [0.13, 0.43], k = 6$), expectations of rejection ($r = 0.30, 95\% \text{ CI } [0.23, 0.38], k = 3$), and concealment ($r = 0.17, 95\% \text{ CI } [0.08, 0.25], k = 2$). Finally, significant pooled correlations were found for the relationship between suicide attempt and distal stress ($r = 0.21, 95\% \text{ CI } [0.15, 0.26], k = 20$) and expectations of rejection ($r = 0.15, 95\% \text{ CI } [0.09, 0.21], k = 2$), but the pooled correlation between suicide attempt and internalized transphobia was only marginally significant ($r = 0.09, 95\% \text{ CI } [0.00, 0.18], k = 4$). There was an insufficient number studies to calculate a pooled effect size for the relationship between suicide attempt and concealment, but the one included study that examined this relationship (Cogan, Scholl, Cole, & Davis, 2020) found that the association was not significant ($r = -0.01, 95\% \text{ CI } [-0.16, 0.15]$).

Moderator analyses. Meta-regression was used to determine whether

effect sizes were significantly moderated by study-level variables (i.e., sample size, year of publication, country, mean age, % assigned female at birth, % sexual minority, % non-White). Moderator analyses were only conducted for minority stress-mental health pairs for which $k \geq 10$. Since the majority of included studies consisted of samples from the United States and/or Canada, the country variable was dichotomized as US/Canada vs. non-US/Canada for moderator analyses.

When moderators were entered individually, effect sizes for the relationship between distal stress and suicidal ideation were significantly moderated by the proportion of the sample that identifies as a sexual minority ($z = -2.208, p = .026, R^2 = 0.412, k = 12$) and proportion of the sample that identifies as non-White ($z = 3.354, p < .001, R^2 = 0.530, k = 19$). These effects were such that the relationship between distal stress and suicidal ideation was weaker in samples with greater proportions of sexual minorities and stronger in samples with greater proportions of non-White participants. When these moderators were entered together, they accounted for 54.33% of the variance in effect size. Only the proportion of the sample that identifies as a sexual minority remained significant ($z = -2.127, p = .033, k = 11$). No significant moderators were found for the relationship between distal stress and depression and suicide attempt.

Regarding proximal stress constructs, when moderators were entered individually, effect sizes for the relationship between concealment and depression were significantly moderated by proportion of the sample that identifies as a sexual minority ($z = 1.843, p = .065, R^2 = 1.000, k = 4$). No significant moderators were found for the relationship between depression and internalized transphobia or expectations of rejection.

2.4. Publication bias

The funnel plot for studies assessing the relationship between distal stress and depression is displayed in Fig. 2. Egger's test for funnel plot asymmetry found that there was no significant asymmetry for any of the minority stress-outcome pairs with ≥ 10 (all $p > .05$).

All but one of the minority stress-mental health pairs had fail-safe n values that exceeded the cutoff defined by Rosenthal (1979). Thus, with the exception of the association between internalized transphobia and suicide attempt ($N_{fs} = 18, 5k + 10 = 30$), relationships between minority stress and mental health outcomes appeared robust to publication bias. There was an insufficient number of studies examining the association between concealment and suicide attempt ($k = 1$) to calculate a fail-safe n for that relationship.

2.5. Study quality assessment

AXIS ratings for studies included in the current meta-analysis are presented in Table C1. A number of common limitations can be identified from these ratings. With very few exceptions (e.g., Vance, Boyer,

Table 1
Pooled effect sizes and measures of heterogeneity for relationships between minority stress and mental health constructs.

Predictor	Outcome	k	n	Effect size			Heterogeneity		
				r [95% CI]	z	p	I ²	Q	p
Distal	Depression	56	25,466	0.26 [0.22, 0.30]	11.78	< 0.001	89.9	547.21	< 0.001
IT	Depression	16	5014	0.33 [0.24, 0.40]	7.34	< 0.001	86.3	109.87	< 0.001
ER	Depression	11	3836	0.35 [0.28, 0.41]	9.19	< 0.001	72.1	35.79	< 0.001
Concealment	Depression	10	3863	0.22 [0.15, 0.29]	6.34	< 0.001	66.1	26.57	0.002
Distal	SI	28	19,615	0.24 [0.19, 0.29]	8.63	< 0.001	91.0	299.45	< 0.001
IT	SI	6	1972	0.29 [0.13, 0.43]	3.49	< 0.001	92.2	64.02	< 0.001
ER	SI	3	1767	0.30 [0.23, 0.38]	7.52	< 0.001	62.1	5.28	0.071
Concealment	SI	2	971	0.17 [0.08, 0.25]	3.91	< 0.001	23.6	1.31	0.253
Distal	SA	20	20,991	0.21 [0.15, 0.26]	7.47	< 0.001	91.7	229.67	< 0.001
IT	SA	4	2238	0.09 [0.00, 0.18]	1.94	0.052	72.0	10.70	0.013
ER	SA	2	951	0.15 [0.09, 0.21]	4.61	< 0.001	0.00	0.43	0.513
Concealment	SA	1	155	-0.01 [-0.16, 0.15]	-	-	-	-	-

Note. CI = confidence interval; ER = expectations of rejection; ES = effect size; IT = internalized transphobia; SA = suicide attempt; SI = suicidal ideation.

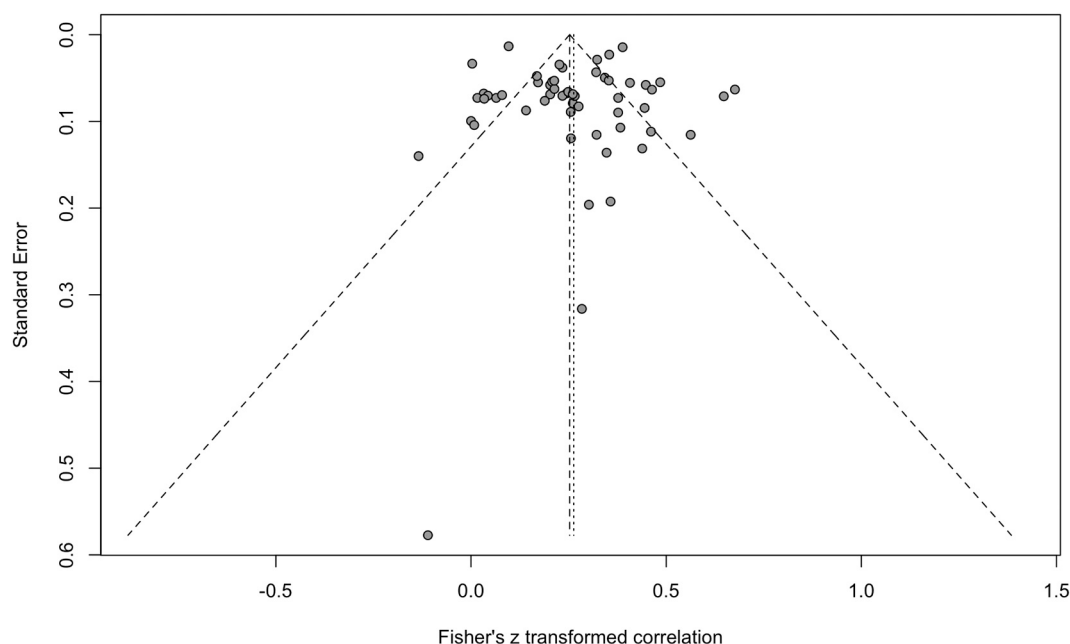


Fig. 2. Funnel plot for studies assessing the relationship between distal stress and depression.

Glidden, & Sevelius, 2021), the vast majority of studies used convenience sampling techniques rather than utilizing population-based samples. Likewise, few studies provided information on non-responders, leaving them potentially susceptible to non-response bias.

3. Discussion

The current study sought to systematically review and meta-analyze existing research examining the relationship between minority stress constructs, depression, suicidal ideation, and suicide attempt in transgender and gender diverse (TGD) individuals. Significant bivariate associations were found between all minority stress constructs (i.e., distal stress, internalized transphobia, expectations of rejection, and concealment) and depression, suicidal ideation, and suicide attempt. For depression and suicidal ideation, effect sizes in the current meta-analysis appear to be larger for expectations of rejection and internalized transphobia when compared to distal stress and concealment. These results provide evidence in support of the minority stress model for TGD individuals (Hendricks & Testa, 2012; Meyer, 2003), namely that higher levels of both distal and proximal minority stress are associated with higher levels of depression and suicidality. Yet, all of the effect sizes that were included in the current meta-analysis were for cross-sectional associations, which are limited in their ability to draw causal inferences. The small amount of longitudinal research that exists in this area suggests that higher levels of distal stress predict future suicidal ideation (Rabasco & Andover, 2021), and both distal and proximal minority stress predict future depressive symptoms (Lloyd, Chalklin, & Bond, 2019). Further research is needed, however, to determine the relative longitudinal effects of different minority stress processes on mental health outcomes in TGD individuals.

The observed greater magnitude of effect sizes for expectations of rejection may be theoretically explained through appraisal theory, which proposes that a person's evaluation of a situation, rather than the situation itself, determines their emotional and affective response to the situation (Moors, Ellsworth, Scherer, & Frijda, 2013; Scherer, 1999). Negative cognitive appraisals have also been theorized to serve as a mediator between stressful life events and depression (Mehu & Scherer, 2015) and suicide (Schematic Appraisal Model of Suicide; Johnson, Gooding, & Tarrrier, 2008). In the context of interpersonal interactions, those who anticipate rejection from others (i.e., have high rejection

sensitivity) are more likely to negatively appraise social interactions, which leads to an increased likelihood of depression (Gao, Assink, Cipriani, & Lin, 2017; Normansell & Wisco, 2017). Although discrete rejection experiences may not lead to significantly lower affect in themselves (Blackhart, Nelson, Knowles, & Baumeister, 2009), over time they can prompt an individual to appraise situations more negatively (Mehu & Scherer, 2015). Thus, it is thought that the effects of external situations (i.e., distal stress) on mental health are largely mediated by internal processes (i.e., proximal stress). As a consequence, such models imply that the effect of distal stress processes on mental health outcomes would generally be smaller than those of proximal stress processes. It is not the *experience* of rejection itself, but rather, the *appraisal* of rejection experiences that determines an individual's affective response to instances of rejection. For those that identify as TGD, this would suggest that expectations of rejection are more strongly associated with depression and suicide than experiencing status-based rejection itself, and this conclusion is supported by the findings of the current meta-analysis.

Internalized transphobia may function similarly to expectations of rejection within the minority stress framework. Negative views of the self are strongly associated with poor mental health outcomes in the general population. For example, low self-esteem significantly predicts depression (Sowislo & Orth, 2013) and viewing oneself as a burden to others predicts suicidality (Chu et al., 2018; Forkmann et al., 2020). Applied to marginalized groups, negative views of one's own marginalized identity can mediate the relationship between identity-based prejudice events and negative mental health outcomes. Such a role of identity-based self-stigma in this relationship has been observed in a variety of marginalized groups, including people with mental illnesses (Kao et al., 2016; Oexle, Waldmann, Staiger, Xu, & Rüsche, 2018; Picco et al., 2017), people with obesity (Hayward, Vartanian, & Pinkus, 2018; Sikorski, Luppa, Luck, & Riedel-Heller, 2015), sexual minorities (Feinstein, Goldfried, & Davila, 2012; Hatzenbuehler, 2009; Walch, Ngamake, Bovornusvakool, & Walker, 2016), and racial/ethnic minorities (Graham, West, Martinez, & Roemer, 2016; Sosoo, Bernard, & Neblett, 2020). This research suggests that the impact of distal stress on mental health depends on internalized stigma, which could explain the greater effect size for internalized transphobia in the current meta-analysis.

Unlike internalized transphobia and expectations of rejection, concealment had a lower observed effect size in the current meta-

analysis compared to distal stress. Concealment plays a unique role within minority stress theory, and the observed lower effect sizes for concealment may be potentially explained by the complex relationship this construct has with mental health outcomes. Concealing a stigmatized identity undoubtedly can be cognitively and affectively taxing (Brennan et al., 2021; Pachankis, 2007), and disclosing a stigmatized identity can lead to positive mental health outcomes (Camacho, Reinka, & Quinn, 2020). Yet, disclosures can have negative consequences when there is a negative response from others (Chaudoir & Fisher, 2010). As a result, individual decisions on whether to conceal one's transgender identity are highly dependent on social context, and frequently require balancing authentic self-expression with considerations of safety and negative disclosure reactions (Brumbaugh-Johnson & Hull, 2019; Fernandez & Birnholtz, 2019; Lev, 2004). Decision-making regarding concealment and disclosure of TGD identity is particularly important within the healthcare context, since practitioners serve as gatekeepers to gender-affirming medical interventions within current standards of care (Ashley, 2019; Coleman et al., 2011). Concerns related to provider reactions to disclosure, knowledge of and competence in TGD issues, and impact of disclosure on quality of care pervade this decision-making process and frequently lead to stress in this population (Friley & Venetis, 2021).

Of note is the finding that the relationship between distal stress and suicidal ideation (SI) was significantly moderated by proportion of the sample that is non-White, such that distal stress was more strongly associated with SI in studies with a greater proportion of non-White participants. This finding could reflect the additive and intersectional nature of minority stress of individuals with multiple marginalized identities. For example, sexual minority people of color experience discrimination based on their combined racial/ethnic and sexual minority identities (Balsam, Molina, Beadnell, Simoni, & Walters, 2011; Cyrus, 2017; McConnell, Janulis, Phillips, Truong, & Birkett, 2018; Ramirez & Galupo, 2019; Sarno, Swann, Newcomb, & Whitton, 2021), which may account for their disproportionately high rates of depression and suicidality (Kimball, Bonds, Brady, & Blashill, 2021; Vargas, Huey, & Miranda, 2020). TGD people of color may likewise experience multiple intersecting forms of minority stress that contribute to their disproportionate rates of poor mental health outcomes (Farvid et al., 2021). Nevertheless, research examining multiple minority stressors in TGD people of color is extremely limited, and future research should prioritize this particularly vulnerable sub-population.

Significant between-study heterogeneity was observed in the effect size estimates of the current meta-analysis, which may be explained by a number of factors. First, the complex relationship between concealment of gender identity and mental health (as described above) may have led to heterogeneity in observed effect sizes across studies. Second, studies varied widely in terms of their sampling frame, and gender minority stress may interact with other forms of minority stress within certain subpopulations of TGD individuals. Third, studies came from a wide variety of countries, which may differ widely in their attitudes and treatment towards TGD populations. Finally, differences in measurement of minority stress and mental health (e.g., multi-item scale vs. single dichotomous item) may have led to heterogeneity of effect sizes across studies.

Between-study heterogeneity may be accounted for by notable differences in study samples used. Many of the studies included in the present analyses sampled from specific sub-populations of TGD individuals, such as TGD veterans (Beckman, Shipherd, Simpson, & Lehavot, 2018; Carter et al., 2019; Ruben, Livingston, Berke, Matza, & Shipherd, 2019; Tucker et al., 2019), and TGD individuals with a history of sex work (Nemoto, Bodeker, & Iwamoto, 2011; She, 2019). It's possible that TGD minority stress may operate differently in these populations due to unique stressors related to the sub-population. For instance, transgender sex workers are significantly more likely to experience violence victimization and forced sex compared to cisgender sex workers (Miller et al., 2020) and transgender individuals who have

not engaged in sex work (Logie et al., 2017). Nevertheless, many of the studies that utilized these specific populations did not differ substantially from the pooled effect sizes that were observed (e.g., Carter et al., 2019, $r = 0.25$ for suicidal ideation and distal stress; for Nemoto et al., 2011, $r = 0.31$ for depression and distal stress). Additional research could help provide insight into how minority stress affects specific subpopulations that may experience additional identity-based stressors.

Studies also differ in their countries of origin, which may further contribute to heterogeneity across studies. Countries range in terms of their attitudes towards TGD communities (Elischberger, Glazier, Hill, & Verduzco-Baker, 2018; Worthen, Lingardi, & Caristo, 2017) and rights (Earle, Hoffarth, Prusaczyk, MacInnis, & Hodson, 2021). As a result, TGD people may experience more minority stress in countries compared to others. Although cross-cultural research on minority stress in TGD populations is limited, sexual minority populations exhibit significant cross-cultural differences in experiences of minority stress (Baiocco et al., 2021; Sattler & Lemke, 2019). Although country of origin (USA/CA vs. non-USA/CA) did not significantly moderate pooled effect sizes in the current meta-analysis, the majority of included studies (69.41%) used samples from the United States and Canada. These results indicate that further research is needed to examine whether there are cross-cultural differences in the impact of minority stress on depression in TGD populations.

Lastly, studies were also heterogeneous in their measurement of variables of interest. Whereas some studies used continuous measures of TGD minority stress with psychometric support (e.g., Gender Minority Stress and Resilience Measure; Testa et al., 2015), others used dichotomous single-item measures. Similar differences in measurement were observed for measures of depression and suicidality. Dichotomous measures have lower reliability and validity compared to continuous measures (e.g., Markon, Chmielewski, & Miller, 2011), and studies that utilize the former may report attenuated correlations due to measurement unreliability. Future research on TGD minority stress would benefit from using empirically-validated and psychometrically strong measures of minority stress and mental health variables.

3.1. Limitations

The results of this meta-analysis should be interpreted in light of its limitations. Substantial heterogeneity in effect sizes was observed across many of the relationships between minority stress and mental health outcomes, which may reflect between-study heterogeneity in the constructs being measured. The construct of distal stress in the current meta-analysis represents a wide array of prejudice events, from minor experiences of transphobia (e.g., transgender-related microaggressions; Austin, Craig, D'Souza, & McInroy, 2020) to physical violence (e.g., Barboza, Dominguez, & Chace, 2016) and sexual victimization (e.g. Scandurra, Amodeo, Bochicchio, Valerio, & Frost, 2017). Researchers that have examined the relative effects of different types of distal stress on psychological outcomes have found that some types of distal stress lead to worse psychological outcomes than others, with non-affirmation of gender identity being more strongly associated with depression and suicidality than gender-related victimization, rejection, or discrimination (Cogan et al., 2020; Hidalgo, Petras, Chen, & Chodzen, 2019; Jäggi et al., 2018; Scandurra et al., 2020; Tebbe, Allan, & Bell, 2019; Testa et al., 2015, 2017). Similarly, although the current meta-analysis conceptualized gender identity concealment as a unitary construct, concealment in TGD populations may be a multi-faceted construct that includes lack of active disclosure, lack of general openness, and lack of public knowledge of a person's TGD identity (Pachankis, Jackson, Fetzner, Mahon, & Bränström, 2021).

Furthermore, some researchers have theorized that the current conceptualization of gender minority stress does not encompass the range of gender-related stressors experienced by those who identify as TGD. Gender dysphoria, for example, has been proposed as an additional proximal stressor that current minority stress theory fails to include

(Lindley & Galupo, 2020). Gender minority stress may also interact with other forms of discrimination (e.g., racism) to create additive forms of stress that cannot be captured by looking at each marginalized identity in isolation (Tan, Treharne, Ellis, Schmidt, & Veale, 2020). Regardless of these aforementioned limitations, the current meta-analysis provides robust evidence for the relationship between minority stress, depression, and suicidality.

3.2. Clinical implications

Finally, the present meta-analysis has important clinical implications. Significant associations between minority stress and mental health outcomes in the current study bolster existing clinical practice guidelines that incorporate minority stress theory in work with TGD clients (e.g., Austin & Craig, 2015; Brewster, Motulsky, & Glaeser, 2019; Puckett & Levitt, 2015). In particular, the larger observed effect sizes for expectations of rejection and internalized transphobia implicate these constructs as essential points of intervention for clinical psychologists. While research has elucidated efficacious interventions for reducing minority stress in sexual minority populations (see Chaudoir, Wang, & Pachankis, 2017 for a review), comparable research is limited for TGD populations. Future research should focus on assessing the efficacy of interventions for TGD populations that focus on proximal minority stress as a point of intervention. Additionally, moderation analyses suggest that TGD people of color are particularly vulnerable to the insidious effect of multiple minority stressors on mental health outcomes. Clinicians working with TGD people of color would benefit from incorporating an intersectional lens into their practice to aid clients in coping with such unique forms of minority stress (Golden & Oransky, 2019; Malpas, Pellicane, & Glaeser, 2021).

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Contributors

Michael Pellicane and Jeffrey Ciesla designed the study. Michael Pellicane conducted literature searches. Michael Pellicane and Jeffrey Ciesla conducted statistical analyses. Michael Pellicane wrote the first draft of the manuscript. Michael Pellicane and Jeffrey Ciesla reviewed and edited the manuscript. All authors contributed to and have approved the final manuscript.

Declaration of Competing Interest

All authors declare that they have no conflicts of interest.

Appendix A. Supplementary data

Supplementary data to this article can be found online at <https://doi.org/10.1016/j.cpr.2021.102113>.

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